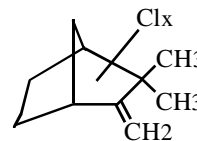


## TOXAPHENE

Toxaphene is a federal hazardous air pollutant and was identified as a toxic air contaminant in April 1993 under AB 2728.

CAS Registry Number: 8001-35-2

Molecular Formula (approximate):  $C_{10}H_{10}Cl_8$



Toxaphene is a mixture of chlorinated camphenes that occurs as a waxy, amber solid and has a pleasant, piney odor. It is practically insoluble in water and is freely soluble in aromatic hydrocarbons. Toxaphene dehydrochlorinates in the presence of alkali, prolonged exposure to sunlight, and at temperatures above 155 °C. When heated to decomposition, it emits toxic fumes of hydrochloric acid and other chlorinated compounds (NTP, 1991).

### Physical Properties of Toxaphene

Synonyms: chlorinated camphene; camphechlor; polychlorocamphene; synthetic 3956; Alltox; Geniphene; Motox; Penphene; Phenacide; Strobane-T; Toxakil

Molecular Weight:	414 (average)
Melting Point:	65 - 90 °C
Vapor Density:	14.3 (air = 1)
Density/Specific Gravity:	1.65 at 25 °C (water = 1)
Vapor Pressure:	0.4 mm Hg at 25 °C
Log Octanol/Water Partition Coefficient:	4.82
Water Solubility:	0.55 mg/l at 20 °C
Henry's Law Constant:	$6.0 \times 10^{-6}$ atm-m <sup>3</sup> /mole at 20 °C
Conversion Factor:	1 ppm = 16.9 mg/m <sup>3</sup>

(Howard, 1990; HSDB, 1991; Merck, 1983; Sax, 1987; Sax, 1989; U.S. EPA, 1994a)

## SOURCES AND EMISSIONS

### A. Sources

Toxaphene was registered for use as a pesticide; however as of December 17, 1987, it is no longer registered for pesticidal use in California (DPR, 1996).

### B. Emissions

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No emissions of toxaphene from stationary sources in California were reported, based on data obtained from the Air Toxics “Hot Spots” Program (AB 2588) (ARB, 1997b).

### C. Natural Occurrence

Toxaphene is not known to occur as a natural product (Howard, 1990).

## **AMBIENT CONCENTRATIONS**

No Air Resources Board data exist for ambient measurements of toxaphene. However, the United States Environmental Protection Agency (U.S. EPA) has compiled ambient concentration data from several locations throughout the United States. Mean concentrations varied from 1.8 nanograms per cubic meter ( $\text{ng}/\text{m}^3$ ) in College Station, Texas from 1979-80 to  $98 \text{ ng}/\text{m}^3$  in Wye River, Maryland during 1982. Ambient concentrations from these studies ranged from less than  $1 \text{ ng}/\text{m}^3$  in Columbia, South Carolina from 1978-79 to  $376 \text{ ng}/\text{m}^3$  in Wye River, Maryland (U.S. EPA, 1993a).

## **INDOOR SOURCES AND CONCENTRATIONS**

No information about the indoor sources and concentrations of toxaphene was found in the readily-available literature.

## **ATMOSPHERIC PERSISTENCE**

Toxaphene is fairly stable in the atmosphere, with a half-life of approximately 4 to 5 days. Toxaphene components in the vapor phase will react with the hydroxyl radical (Atkinson, 1995).

## **AB 2588 RISK ASSESSMENT INFORMATION**

Since no emissions of toxaphene from stationary sources in California have been reported under the AB 2588 program, it was not listed in any of the risk assessments reviewed by the Office of Environmental Health Hazard Assessment.

## **HEALTH EFFECTS**

Probable routes of human exposure to toxaphene are inhalation, ingestion, and dermal contact (NTP, 1994a).

Non-Cancer: Exposure to toxaphene may cause skin, eye, and respiratory tract irritation (Sittig, 1991). Toxaphene is a central nervous system (CNS) convulsant. Ingestion of a large dose may be fatal to humans. Animals orally exposed to toxaphene have shown adverse effects

on the liver, kidney, adrenal and thyroid glands, CNS, and immune system (U.S. EPA, 1994a).

The U.S. EPA has not established a Reference Concentration (RfC) or an oral Reference Dose (RfD) for toxaphene. No information is available on adverse reproductive or developmental effects of toxaphene in humans (U.S. EPA, 1994a).

Reduced fetal or pup weight, and behavioral and immunosuppressive effects have been observed in offspring of rodents orally exposed to toxaphene (ATSDR, 1994d; IARC, 1979; HSDB, 1995).

Cancer: Animals orally exposed to toxaphene showed an increase incidence of thyroid gland and liver tumors. The U.S. EPA has classified toxaphene in Group B2: Probable human carcinogen. The U.S. EPA has calculated an inhalation unit risk estimate of  $3.2 \times 10^{-4}$  (microgram per cubic meter)<sup>-1</sup>. The U.S. EPA estimates that if a person were to breathe air containing toxaphene at 0.003 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) over an entire lifetime, that person would theoretically have no more than a 1 in 1 million increased chance of developing cancer (U.S. EPA, 1994a). The International Agency for Research on Cancer has classified toxaphene in Group 2B: Possible human carcinogen (IARC, 1987a).

The State of California has determined under Proposition 65 that toxaphene (polychlorinated camphenes) is a carcinogen (CCR, 1996). The inhalation potency factor that has been used as a basis for regulatory action in California is  $3.4 \times 10^{-4}$  (microgram per cubic meter)<sup>-1</sup> (OEHHA, 1994). In other words, the potential excess cancer risk for a person exposed over a lifetime to  $1 \mu\text{g}/\text{m}^3$  of toxaphene is estimated to no greater than 340 in 1 million. The oral potency factor that has been used as a basis for regulatory action in California is 1.2 (milligram per kilogram per day)<sup>-1</sup> (OEHHA, 1994).

